

# Introduction

In recent years, increased use of ground and surface water within watersheds of the State of Washington has created concern that insufficient flows will remain for anadromous fish and other uses. In response to this concern, the Washington State Legislature passed the Watershed Management Act of 1998 (ESHB 2514), which provides funding for local watershed planning and delegates the planning to the local level. As a part of this planning, stakeholders within each of the 62 state defined Water Resources Inventory Areas, known as WRIAs, will assess the status of water resources within their WRIA and determine if water is available for allocation. Such assessments will be completed through hydrologic analysis.

This report presents the results of an initial hydrologic analysis and assessment for WRIA 20, which is inclusive of the watersheds embraced by the Hoh River on the south, the Soleduck River on the west, and the Wa'atch River on the north. This area also contains the stream systems of the Quillayute River and Lake Ozette. This assessment was completed for the WRIA 20 local watershed management group made up of stakeholders in the management area.

This report provides a comprehensive appraisal level overview of watershed conditions within WRIA 20, wherein characteristics are defined for the contributing drainage of selected streams. Of principal importance, the indicated range of flow variability and volumetric discharge at specified locations along the stream is presented for each selected stream. Flow variability and volumetric discharge were calculated for both gaged and ungaged watersheds.

Incidental streamflow measurements collected in the future will help to evaluate changes in stream conditions that affect stream baseflow, or discharges above stream baseflow. This report provides a starting point from which the water resources picture of WRIA 20 may be examined.

Preparation of this report was accomplished using easily accessed information, and reasonably simple methods and procedures. A detailed description of the methods used is provided in Appendix 1. Watershed assessments were developed from 7.5 minute, 1:24000 scale topographic sheets that are provided in Digital Raster Graphic (DRG) form by the U. S. Geological Survey. The map overlays included with this report, were developed using interpretive techniques to delineate subwatershed areas, based on factors that defined watershed characteristics such as elevation, integration of the drainage network, and valley/streamcourse characteristics. Watershed drainage areas were determined using a Geographic Information System (GIS).

## **Watershed Conditions and Seasonal Variability for Select Streams within WRIA 20**

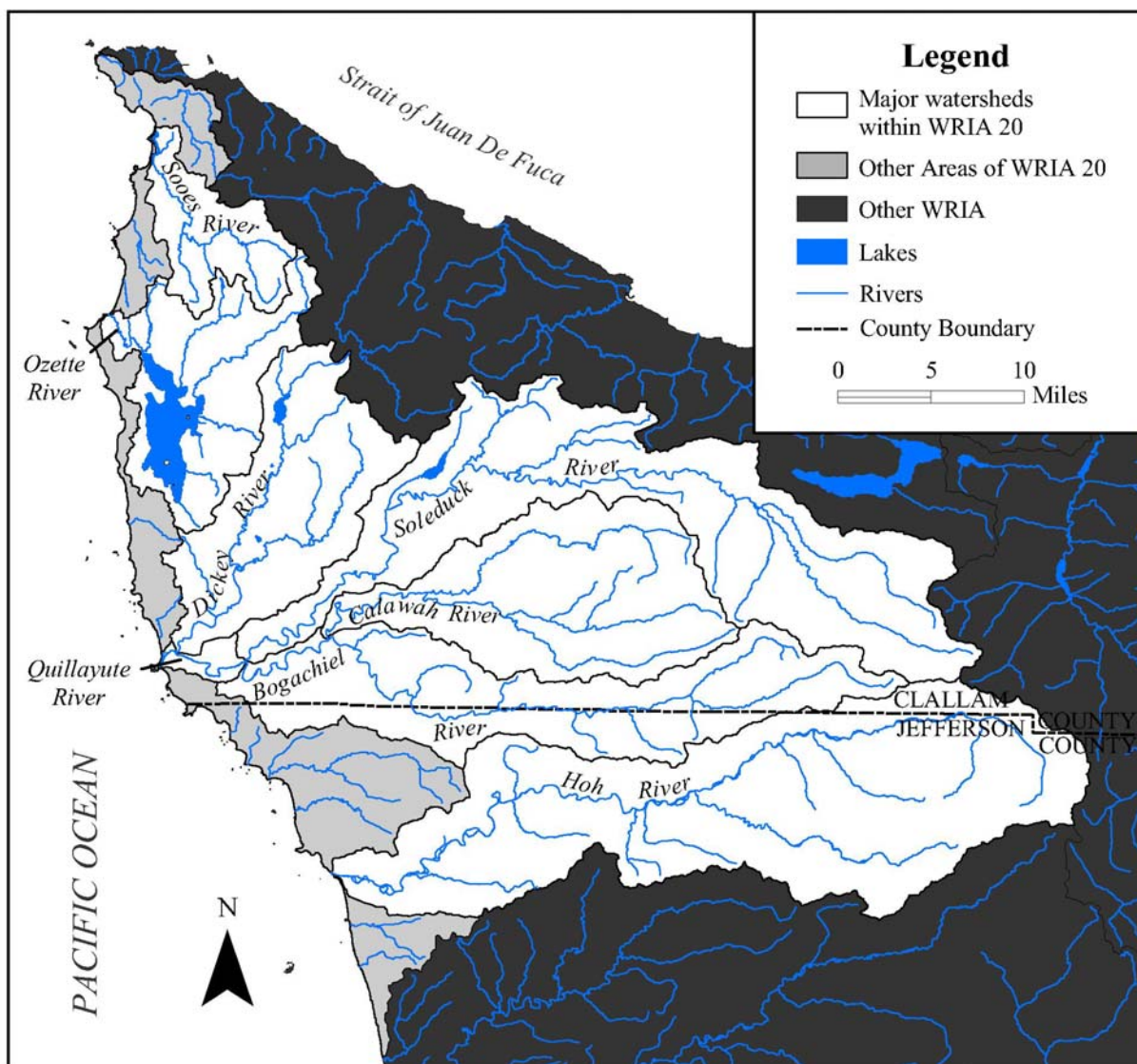
Field data, in the form of precipitation histories and streamflow histories, were obtained from sources documented in this report. These data are available from the U. S. Geological Survey and the National Oceanographic and Atmospheric Administration. Some of the data used in this report was provided on compact disk published by Hydrosphere, Boulder, Colorado. Statistical techniques used to evaluate these data, are well documented in the literature. Results similar to those developed for this report can be achieved using the tools available in spreadsheet software, such as Excel. However, some of the numerical and statistical techniques used in this report were specifically tailored for this effort.

### **Acknowledgements –**

Several people were influential to the development of this report and the underlying data. Thomas Perry engendered enormous creativity in the development of unique methodologies. Joseph Lyons provided endless attention and an enormous ability to be decisive and comprehend complex hydrology. Jeff Shellberg of the Makah Indian Tribe provided a critical assessment of Reclamation efforts, as well as invaluable data collection. Thomas Bellinger provided a keen eye in the peer review process. James Jorgensen of the Hoh Indian Tribe, Ed Chadd of the Streamkeepers of Clallam County, and Patrick McNeil of Region 6 of the U.S. Forest Service provided data upon the slightest request. Valerie Streeter continued the excellent working relationship between Reclamation and the State of Washington that Cynthia Nelson began several years ago in WRIA 18. Finally, Dave Nelson provided the vision and continued support to make this assessment a reality.

## Study Area

The study area encompasses the majority of WRIA 20 on the Olympic Peninsula of the State of Washington. Watershed boundaries defining WRIA 20 are those inclusively encompassing the watersheds of the Hoh River, Quillayute River, Ozette River, and the Sooes River. The Wa'atch River watershed is also within WRIA 20, but was not included in this study.



**Figure 1.** Map of WRIA 20.

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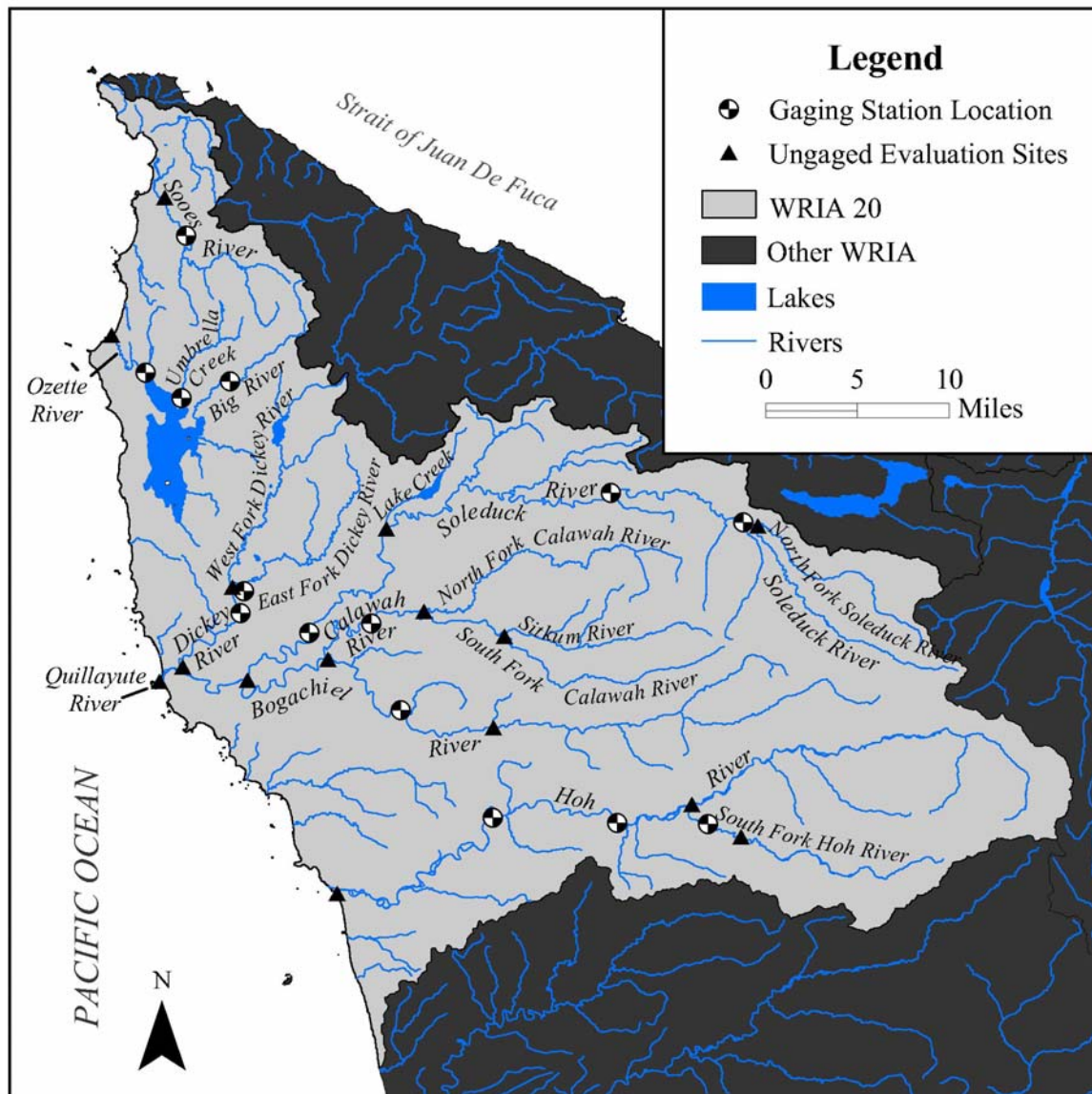
## Watershed Conditions and Flow Evaluations

Streamflow histories were developed and evaluated for variability at select locations along individual streamcourses, as shown in Figure 2 below. These locations were chosen by the WRIA 20 planning group, including members of the initiating governments, in conjunction with employees of Golder Associates in Seattle, who were asked to develop the WRIA 20 planning report. The results of these evaluations are presented in the following section.

Streamflow variability was evaluated from the monthly flow records between October 1961 and September 1999. Streamflow histories were developed at more than one particular location along each stream so that downstream changes in the character of flow could be observed. The methodology employed to estimate a complete streamflow history for each location and then evaluate the recurrence interval of each level of streamflow is described in Appendix 1. In general, extended streamflow histories between October 1961 and September 1999 were developed at gaging station locations using regression techniques. Flow histories were developed for ungaged evaluation sites using the watershed characteristics method or a modified drainage-area method. Streamflow data compiled and used in these evaluations are assumed to represent natural watershed conditions. The resulting natural flows were assumed to not be adversely impacted by development within the watershed for which the evaluation is being completed. Accommodations for changes in watershed conditions were not indicated for this appraisal level assessment. Basin-specific information used to develop these data is included in the following section, and this information is supplemental to the methodology description in Appendix 1.

The following discussion of watershed characteristics and streamflow variability is organized into specific WRIA 20 subwatersheds. For each watershed, conditions evident from aerial photography and topographic maps are described. The discussion begins with the Hoh watershed and proceeds in a northern direction up the west coast of the Olympic Peninsula. Because all gaging station records used are tabulated as water year records, the evaluation results are given in the water year format from October through September.

## Watershed Conditions and Seasonal Variability for Select Streams within WRIA 20



**Figure 2.** Select gaged and ungaged sites where streamflow was evaluated within WRIA 20.